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Development of the Railroads of North America and of their Control by the State

By

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Stevens Indicator

October, 1911, Vol. XXVIII, No. 4

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UNIV. OF CALIFORNIA

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Vol. XXVIII OCTOBER, 1911 No. 4

DEVELOPMENT OF THE RAILROADS OF NORTH AMERICA AND OF THEIR CONTROL BY THE STATE *

By James Douglas, LL.D.

RAILROAD building commenced on this side of the Atlantic very shortly after roads on rails were recognized to be the most economical and the safest medium of transportation. As the name given them implies, the railroads were regarded as public highways to be used on the payment of a certain toll by private vehicles. This was the case in England as well as here. But in England from the first the railroads were corporate property, whereas here, it was, in some states, taken for granted that they would be owned and operated by the public. Moreover, in this country, when railroads were first projected, fodder being cheap and fuel being dearer than in England, horse traction was proposed, and in some cases used. From a report made in 1829 to the State of Massachusetts, on the " Practicability and Expediency of a Railroad from Boston to the Hudson River," the following extracts will interest you as indicative of what a railway was intended to be.

> "*English Rails.*—English rails rolled thirty-five pounds to the yard are 'supported' at every yard of distance, by cast iron *chairs*, which are bolted to a foundation stone, and are formed with a nitch or groove, in which the rails are inserted and confined by an iron bolt.
>
> *Rail Preferred.*—In this climate it is necessary that the foundations for the rails, of whatever material they are formed, should be laid below the reach of frost. It is found that the cost of a continuous stone wall, laid so deep in the ground as not to be moved by the efforts of frost, and surmounted by a rail of split granite of about a foot in thickness and depth,

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* A lecture delivered before the Stevens Engineering Society.

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with a bar of iron placed on the top of it, of sufficient thickness to form the track on which the carriage wheels shall run, is much less than that of the English iron rail, and that rails of this construction, so far as can be judged from experiments which have yet been made, possess all the advantages of solidity, durability, and strength. For the proper adjustment of the bar iron, and to give proper play to the flanges of the wheels, it is necessary that the upper surface of the granite rail, and also the upper edge of the inner face, should be hammered; and the bar must be attached to the rail, by means of bolts or rivets, at distances of about a foot from one another. The pair of rails thus placed, at the uniform distance of five feet from each other, as nearly horizontal as possible, with the space between them filled to within six inches of the upper surface with earth and gravel, so as to form a path for the horses employed in drawing the carriages, constitute the railroad (see pages 4–5).

"*Costs.*—Before the estimates for the construction of the road were made, Mr. Willard, an eminent architect, who has been particularly conversant in the erection of edifices of granite, and with the quarrying of this kind of stone, was employed to examine, in company with Mr. Makepeace, one of the directors, the quarries of granite near the line of the road. His report on this subject, which shows that abundant supplies of excellent stone are to be found along the line from Framingham to Palmer, and from Russell to Washington, is annexed to this report. Measures were also taken by the directors, to obtain from the manufacturers in England, satisfactory information of the cost of iron, rolled to the shape best suited to be placed on the rail stone, to form the track of the rail. With these facts, and those within the scope of the inquiries, and practical information of the engineer, he has made his estimates of the cost of constructing the road. These are stated in detail in his report.

According to these estimates, 'the average cost per mile,' of forming the road twenty-two feet in width, from Boston to the border of the State of New York, including the excavation, embankments, walls, bridges, culverts, and other work preparatory to laying the stone foundations, will be, Grading	$4,770.06
Iron for four rails, with bolts, per mile, including four passings from one track to the other and back......................	1,935.04
Rail stone, including the quarrying, carting, hammering, laying, drilling, and putting on the iron, per mile..................	6,020.80
Digging trenches, carting stone, and laying wall to support the rail stone, and gravelling horse paths, per mile............	2,164.30
Total	$14,940.70

"If we add to this amount ten per cent to cover the cost of further surveys, superintendence, and unforeseen contingencies, the whole estimate will be $16,434.77 per mile. At this rate, the cost of making the road from Boston to the border of the State of New York, on the line which forms the basis of the estimates, would be $2,638,628.64, and of carrying it to the city of Albany, $3,254,876.46.

"No particular estimate has been made of the cost of land, damage to private property, the cost of fences, and of stone in the quarry. Assurances have been given very generally, that no claim will be made for damages or compensation, for land or fencing. Some attempts were made to obtain formal releases, but it was found difficult to accomplish this object to any considerable extent, before the final location of the road. The amount of damage will be small, and there is reason to believe that, in most cases, none will be claimed. Whatever it may be, the allowance of ten per cent included in the estimate, it is presumed, will be sufficient to cover it, with all other contingencies."

The Commission unhesitatingly recommended horsepower in operating the road.

Horsepower Calculated.—The measure of steady performance through the day, for a horse moving at a slow and natural pace, and traveling twenty miles a day, may be taken at about 125 pounds. This exertion is equivalent to drawing a load of eleven or twelve tons, the weight of carriages included, on a good level railroad. If we suppose a railroad to be, for the most part nearly level, with undulations, in either direction extending sometimes to twenty-six feet in a mile, but never far exceeding that limit, an average load adapted to it, for a single horse, traveling at a slow pace, may be estimated at ten tons.

But the labor of the horse may be relieved by providing a platform, placed on small wheels, on the long descents, on which the horse himself may ride. This expedient, singular as it may seem to persons unaccustomed to observe the ease of locomotion on a railroad, is adopted with success on the Darlington and Mauch Chunk railroads, and the horses eat their provender, while they are returning to a point where their labour is to be resumed.

In estimating cost of operation they say:

We will suppose the load for a single horse, exclusive of wagons, to be 16,000 lbs. or three tons, by the statute of this Commonwealth. Two horses therefore with a single driver, would be sufficient to conduct several carriages, conveying sixteen tons on all the level and descending parts of the road, and also on the parts ascending, at a rate not exceeding 26 feet in a mile. On the portions ascending above 26 feet in a mile, if stationary powers are not provided, additional horses will be required, except where the excess is slight and for short distances. In a temporary exertion, such as horses traveling with heavy loads, on common roads are always required to make in passing hills, the power of the two horses would be competent to draw the 16 tons over ascents of 40 or 50 feet to a mile. But to save the strength of the horses, and to maintain a convenient rate of speed, it would be expedient to provide additional horses, at least on all the portions of any considerable extent, where the inclination exceeds 26 or 30 feet. On the parts of the road inclining from 26 to 52 feet, measuring 39 miles between Boston and the New York line, and about 46 miles between Boston and Albany, one additional horse would be sufficient. On the inclinations from 52 to 80 feet, two additional horses, or double the number required on the level parts of the road would be necessary. The sections which have this inclination between Boston and the New York line measure 43½ miles, and for the remaining portion of the road, from the state line to Albany, nearly 8½ miles must be added, making 52 miles.

The most easy and convenient rate of traveling would perhaps average about three miles an hour, and the journey may be accomplished in four days. The wages and subsistence of a man to conduct the teams may be estimated at a dollar a day. The cost of that labour of a horse, including interest on the purchase, depreciation of value, hazard, keeping, and shoeing, is about 50 cents a day. The cost of six carriages, sufficient to carry 16 tons, 75 cents a day. An allowance must also be made for profit to the carrier, and the hazard of going sometimes partially loaded, of about 50 per cent on all expenses. This allowance, it is thought, will be sufficient to cover a fair charge for heavy goods, paying the lowest rates of freight. Some additional profit might be obtained by higher charges on more costly goods. Upon these data, the cost of transportation between Boston and Albany, may be estimated as follows:

If the road be made with stationary powers,	
20 horses at 50 cents per day	$10.00
1 man, 4 days at $1	4.00
Carriages, 4 days at 75 cents	3.00
	$17.00
Add 50 per cent	8.50
For conveyance of 16 tons	$25.50
20 horses at 50 cents	$10.00
Without stationary powers,	
20 horses at 50 cents	$10.00
8 horses additional	4.00
1 man, 4 days	4.00
Carriages	3.00
	$21.00
Add 50 per cent	10.50
For 16 tons	$31.50
Cost per ton	1.97

> These estimates are intended to show the cost, exclusive of tolls, at which heavy articles, paying the lowest rates of freight, and of which it may be presumed there will in general be a sufficient quantity to employ the regular carriers, so that not much loss may be sustained from want of freight. These rates are perhaps lower than the cost of transportation on any of the canals in this country.

In discussing freight rates, the Commissioners are already face to face with the difficulties originating in water competition, and the low water rates which the railroad must meet. They say:

> "On articles carried through from Boston to Albany, or the reverse, it would be only requisite, for securing to the railroad the whole transport, that the freight should be as low as the freight, together with insurance, by water; as the greater expedition and certainty of conveyance would be advantages of sufficient moment to secure a preference. The customary rates of freight by sloop navigation, between Boston and Albany are from three to four dollars per ton, but it is sometimes procured as low as $2.50. The usual rate of insurance is about three quarters per cent. The lowest charge for freight of flour is 25 cents per barrel, which, with the addition of insurance, will make 28 or 30 cents. If we add to the foregoing estimates of the cost of transportation by the railroad, one dollar a ton, for tolls, a sum equal to a trifle more than half a cent a mile, it will give $2.59 and $2.97 per ton. These rates on the barrel of flour would be equal to 26 and 30 cents. Either rate would probably be low enough to secure to the railroad the carriage of all the flour between Albany and Boston. But if these rates should be found too high, a reduction of five cents per barrel might be made by reducing the toll one half."

Already discrimination to compensate for low competitive rates between competitive points suggests itself to the Commissioners.

> "The cost of transportation by water, from Springfield to Boston or New York is greater, and will be, even when the Enfield locks are completed, than from Albany to Boston. The cost by railroad will not exceed half this amount, and consequently all articles brought upon it from the Connecticut River to Boston, may pay double the toll above mentioned, and the cost of conveyance will still be less, than the lower rate of freight by water."

In estimating Passenger Rates the Report adds:

> It will be found that an active horse may travel 12 or 13 miles a day, at the rate of 9 miles an hour, including the necessary stops, and drawing with a force equal to raising a weight of 28 lbs. This power would be sufficient to draw, on a railroad of the description above supposed, a weight of 2½ tons, or a carriage with 20 passengers, with their baggage. On this assumption, the estimate of cost in transporting passengers, by the railroad, between Boston and Albany, if provided with stationary powers will be as follows:

16 horses traveling 12 or 13 miles each, at 50 cents	$8.00
2 men and 1 carriage	3.00
	$11.00
Add 50 per cent	5.50
For 20 passengers	$16.50
For each passenger 82½ cents	

> Or if we suppose the road to be constructed without stationary powers, two horses will be required instead of one on those stages which include the steepest parts of the road, to the number perhaps of six additional horses, in which case the estimate will be

22 horses at 50 cents	$11.00
2 men and 1 carriage	3.00
	$14.00
Add 50 per cent	7.00
For 20 passengers	$21.00

> For each passenger one dollar and five cents. To each estimate add two dollars, for toll, and it will make $2.82 or $3.05 for conveyance from Boston to Albany in 22 hours.

State ownership, if the railroads were simply toll roads on rails, was by some states, in the early days of railroading, looked upon as a matter of course. The proposed road from Boston to Albany it was assumed would be built by the State. When the scheme was ultimately carried out it was built by corporate wealth, and slowly, in sections. The first section to Lowell had to fight the opposition of the Middlesex Canal, but was opened to traffic in 1835. The cars were, however, not drawn by horses but by two locomotives imported from England. But in conservative Pennsylvania the State retained control of the main lines of traffic until the early fifties. Nevertheless, the first Pennsylvania railroad, the Philadelphia, Germantown & Norristown Railroad, incorporated in 1831, was built with private capital, and it was to supply it with motive power that Mathew Baldwin designed and constructed his first locomotive. It was not a brilliant success.

In the early days on both sides of the Atlantic the contest between the canals and the railroads was acute.

The editor of the *Railroad Journal,* in introducing his first number to the public, on January 2, 1832, argues in favor of the railroad against the canal. Referring to experiments being made in Canada to determine the relative cost of rail and water transportation, he adds:

> Further investigation may lead to the construction of new canals, of the value of which for part of the year we are fully aware; or it may confirm the opinion, fast gaining ground in this country, that railroads will in a great measure supersede canals; and therefore hasten the construction of a few important lines through those parts of the country where the amount of business will warrant the undertaking.

In fact the one method of transportation reacted acutely on the other; the canals stimulated railroad building, and yet retarded it.

It was the opening of the Erie Canal, and its influence in deflecting trade to New York through the only natural gap in the Alleghanies between the lake and the sea that induced the State of Pennsylvania to create a board of Canal Commissioners who were also State Railroad Commissioners. But preferring canals to railroads, they admitted the value of the latter only in certain exceptional situations, and therefore combined the land and water systems in their plans for interstate transportation. For instance, the initial line from Philadelphia to Harrisburg consisted of a railroad from Philadelphia to Columbia,* and a canal thence to Harrisburg. The road was opened on October 7, 1834, the Governor and staff spending one day on the canal to reach Columbus from Harrisburg, and the next day on the railroad in reaching Philadelphia. To escape the charge of favoring monopolies the Canal Commission allowed two firms to operate separate trains on the road by horsepower. To run the trains by locomotives owned and operated by the State was vigorously opposed, as the patronage this would confer on the Canal Commissioners, it was considered, would be a public menace. The argument, still used to-day, was conclusive then. The locomotive, however, inevitably displaced the horse, and though it hauled private cars, its introduction involved a time-table. But as a compromise to progress the farmer consented that during five hours of the day and four hours by night the horse and carts were given right of way over the locomotive. The use of horses on some Pennsylvania roads was not entirely abandoned until 1850. Meanwhile, the people of Pennsylvania had to depend for transportation between Philadelphia and Pittsburgh on the portage route, with its inclines and stationary engines, to cross the Alleghany Mountains; the Philadelphia & Columbus Railroad; and 277 miles of canals, at an expenditure of time of 91 hours and a charge of $15.00 per ticket. Though the public had to submit, it was by no means satisfied, and discontent won the fight, when the Baltimore & Ohio begged for a charter to enter Pittsburgh in 1845, and the Pennsylvania Company was given a promise of preference, if it fulfilled certain conditions. This it lived up to. Meanwhile, the State

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*One of the incorporators of this short road from Philadelphia to Columbus was John Stevens, and if he had been able to carry out his plans, and the ability of himself and his sons to do so no one can now doubt, Pittsburgh would have been linked with the seaboard by a railroad about twenty years earlier than that event happened, for through Mr. Stevens's exertions the legislature incorporated a company to construct a road from Harrisburg through to Pittsburgh as early as 1823.

Commissioners had learned how to make the railroads and canals subserve party politics rather than the public welfare, by political assessments on employees, with the inevitable employment of unnecessary men to swell the contribution, and overload the payrolls, by the liberal distribution of passes, and by using other means of conferring favors to shippers and partisans. Thus political corruption absorbed the revenues of the canals and the railroads, and resulted, after an agonizing death struggle, in the demise of the state ownership of railroads in Pennsylvania. To-day the only other railroad north of the Mexican Boundary owned by the state is the Intercolonial Railroad of Canada. Be the reason what it may, it has never been made to pay—sometimes not even its legitimate operating expenses. Will the experiment of state ownership in Mexico be more successful?

The following extracts as to early Railroads in Pennsylvania are from *The Traveller's Guide*, Saratoga, 1833:

> The Philadelphia and Norristown Railroad commences at the corner of Ninth and Spring-Garden Streets in Philadelphia, and passes through Germantown, six miles distant, and from thence to Norristown, nine miles farther. The road is formed chiefly of stone blocks, with heavy iron rails fastened thereon, similar to the construction of the Manchester and Liverpool road. Until reaching Cohocksink creek, which is crossed by a large viaduct, the graduated surface is seventy feet, on each side of which streets are opened, and several squares of buildings have been erected. The whole line of the road is interesting, and the patronage which it has thus far received has been handsome.
>
> The Columbia and Philadelphia Railroad commences at the junction of Broad and Cedar Streets in Philadelphia, crosses the Schuylkill at Peters' Island, passes Paoli, Downingtown, Coatsville, Lancaster and Mount Pleasant to Columbia, on the Susquehanna, where it joins the Pennsylvania canal. Length, eighty miles. The road consists of a double track, and is composed of the most solid and durable materials; one line being a continuous stone rail with an iron plate, and the other consisting of heavy stone blocks and iron rails. Locomotive power, as well as horse, is used, in conveying passengers and freight.
>
> Both of these roads are the property, and are made at the expense of the state.

Three years later Peck's *Guide for Emigrants*, Boston, 1836, gives both information and advice.

Page 368. From Philadelphia to Pittsburg, via railroad and canal.

	MILES
Columbia on the Susquehanna River by railroad, daily	81
By canal packets to Bainbridge	11– 92
Middletown	17–109
Harrisburg	10–119
Juniatta River	15–134
Millerstown	17–151
Mifflin	17–168
Lewistown	13–181
Waynesburg	14–195
Hamiltonville	11-206
Huntington	7-213
Petersburg	8-221
Alexandria	23-244
Frankstown and Holladaysburgh	3-247
From thence by railroad across the mountain to Johnstown is	38–285
By canal to Blairsville	35–320
Salzburg	18-338
Warren	12–350
Allegheny River	16–366
Pittsburg	28–394

The *Pioneer* line on this route is exclusively for passengers, and professes to reach Pittsburg in *four days*—but it is sometimes behind several hours. Fare through, $10. Passengers pay for meals.

Page 373. The following is from an advertisement of the Western Transportation, or Leech's Line, from Philadelphia:

	MILES	DAYS	
Fare to Pittsburg	400	6½	$6.00
" " Cincinnati	900	8½	8.50
" " Louisville	1,050	9½	9.00
" " Nashville	1,650	13½	13.00
" " St. Louis	1,750	14	13.00

The above does not include meals.

Packet Boats for Cabin Passengers, same line:

	MILES	DAYS	
Fare to Pittsburg	400	5	$7.00
" " Cincinnati	900	8	17.00
" " Louisville	1,050	9	19.00
" " Nashville	1,650	13	27.00
" " St. Louis	1,750	13	27.00

Emigrants and travellers will find it to their interest always to be a little sceptical relative to the statements of stage, steam and canal boat agents, to make some allowance in their own calculations for delays, difficulties and expenses, and above all, to *feel* perfectly patient and in good humor with themselves, the officers, company and the world, even if they do not move quite as rapid, and fare quite as well as they desire.

In the competition between water transportation and railroad transportation in the early days, though the railroads had acquired the upper hand, they sometimes found it good policy to absorb their feeble competitors. We have seen how the Pennsylvania Canal Commissioners tried to control and subordinate the land to the waterways. The Philadelphia & Reading Railroad found it desirable to lease the property of the Schuylkill Navigation Company in 1870, which consisted of 108 miles of canal and also the Susquehanna Canal, 45 miles long, in 1872. On the other hand the Delaware & Hudson Canal Company began as a Canal Company, was chartered in 1832 to construct the canal and a gravity road from the anthracite coal fields of Pennsylvania to the Hudson River at Rondout.

The Middlesex Canal, the first canal opened for general traffic early in the nineteenth century, was a competitor of the railroad in Massachusetts; and the Chesapeake & Ohio Canal obstructed the building of the Baltimore & Ohio Railroad. In England the railroads often absorbed the canals, and controlled them without obliterating their traffic. On the continent, especially in Belgium and Germany, owing to the favorable configuration of the country, there is great activity in canal building with the view of even converting inland towns into seaports. Here, as we all know, there is a revival of interests in inland water transportation by river and canal. It has become both a political and an economical issue. It will be decided on economical results and only when experience proves that goods and passengers can be carried at rates so much below those offered by railroads as to compensate for the extra time involved in the transportation. Doubtless, if a fraction of the engineering skill had been devoted during the past century to the development of canal and fluvial transportation, which has been directed to railroads and ocean navigation, the canals would probably carry a larger share than they do of freight, and rivers would have been made more fit for boats of larger burden. The growing traffic on the Lakes encourages the hope that the water may become a more active competitor of land transportation, but Lake traffic has demanded and been supplied with larger steamboats and their consorts than any canal now projected can accommodate, or than any of our rivers are deep enough to float for any great distance from their mouths.

But it will be interesting to watch the future direction of competition between the railroad and the canal. It certainly will not result in the absorption of the canals by the railroads as was formerly the case. The Federal Government, with the channels of the large rivers dredged and maintained open at great expense, and the states owning the canals, deepened and widened, are more likely to swallow the railroads than to be swallowed by them, should competition excite a conflict.

The first railroad meeting of private promoters held in this country was in the house of Mr. George Brown, of Baltimore, on February 12, 1827. It initiated the building of the Baltimore & Ohio, and so anxious and enthusiastic were those present for a speedy action that the act of incorporation of the railroad was passed on February 28, 1827.

But construction was slow and financing was difficult. At first horse power was used, and the freight and passenger rates were collected as tolls. Not till 1832 had the track reached Point of Rocks on the Potomac, seventy-two miles from Baltimore. Then a bitter fight commenced with the Chesapeake & Ohio Canal. But as we have seen, Maryland, under private ownership, despite canal opposition, beat Pennsylvania, with state control of canals and railroads, in the race of railroad building; for the Baltimore & Ohio was prepared to enter before the Pennsylvania had connected that busy town with a seaport by an all rail route.

South Carolina followed Maryland with a six-mile road from Charleston to Hamburg in 1831; but the next and most daring railroad scheme was the building of the Erie from the Hudson to the Lake—projected by Mr. Eleazor Lord of New York, and encouraged by several large public meetings at points along the projected road in 1831. The charter was granted for the New York & Erie Railroad on April 24, 1832, but the formal opening of the road by President Fillmore from Piermont, the terminus on the Hudson, to Dunkirk on Lake Erie, did not take place until May, 1851.

In striking contrast to the slowness with which these enterprises were carried out was the rapidity with which the Camden & Amboy Railroad was conceived and built by your founder and his brother, Robert Livingston Stevens. They were men to whom navigation and transportation by land, and all the arts of peace and war, are debtors, not only for great engineering inventions, but for that stimulus of faith and hope which distinguished them, and with which they have galvanized their successors. It was Robert L. Stevens, the elder brother of your benefactor, Mr. Edwin A. Stevens, to whom our railroads owe, not only the abandonment of the clumsy track, but the designs of the rails which have stood not only the strain of three quarters of a century's use, but the strain of our heavy rolling equipment. The Camden & Amboy Railroad was incorporated in 1830 with Robert L. Stevens as President and Edwin A. Stevens as Treasurer; but, as described in your "Morton Memorial," Mr. Robert L. Stevens, anxious to see the Liverpool & Manchester Railroad, which was opened that year, before commencing construction, went to England with "permission from his directors to buy an all-iron rail in preference to wooden rails, or the stone stringer thinly plated with strap iron. In those days there were no rolling mills in America to make T rails, and as labor and metal in this country were scarce and dear, he wished to get a rail that would dispense with the chair to hold it in place. During the long voyage to Liverpool, in good

Yankee fashion, he whittled bits of wood into various shapes, and finally selected the form in which a suitable base was added to the T rail, making a continuous foot or flange and dispensing with the chair. The moment he landed on the Mersey shore, he asked for bids on 500 tons of this form, since known universally as the Stevens or American rail, and now the general form used by every road in the United States. Concurrently Mr. Stevens designed the hook headed spike which is the ordinary railroad spike of the present day, the iron tongue or tie piece, which has grown into the fish-plate, and the bolts and nuts required to give integrity to the track construction.

" Shortly after his arrival in England Mr. Stevens saw the Planet of the Stevensons at work on the Liverpool line, and at once ordered a locomotive of the same character for his own road. This purchase—the John Bull—was landed in August, 1831, and was put together immediately. She weighed ten tons, with a boiler thirteen feet long and three and one half feet in diameter, cylinders nine by twenty inches, a fire box surface of thirty-six feet; four driving wheels; and a rail gauge of five feet between centers. There was no tender. The fuel and water were carried on a rough four-wheeled flat car. The tank consisted of a whisky barrel from a Bordentown storekeeper, and the hose leading to the boiler was made of leather by a local shoemaker."

" The record of the road reveals the trial or adoption of many things now familiar to every schoolboy—the first pilot, planned in 1832 by Robert L. Stevens; spiking the rail directly to the cross tie, the bogie truck, and forms of the vestibule car; methods of wood preservation, and a host of other features whose permanence depended largely on approval by this foremost among the pioneer railroads of America." *

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* The old-fashioned rail and chair into which the rail is held secure, and kept in adjustment by a wooden wedge, still holds its ground in England, not by reason only of old-fashioned conservatism, but because,

If the railroads of the continent owe to the mechanical ingenuity of Robert L. Stevens perhaps more than to any other man the type and shape, and some of the permanent features of our American Railroad construction and equipment, they owe to his brother, E. A. Stevens, what has been no less essential to their success, as the main factor in the industrial development of this country, the working out of a successful form of organization for the control of their finances, and their departmental operating forces.

The Hon. Abram Hewitt, at the "Founder's Banquet" in 1897, said with regard to this Camden & Amboy Railroad and its builders:

"Robert L. Stevens, as you all know, was the designer of what is known as the flange rail. He had it made in Wales at the works of Sir John Guest, and with such expedition that within two years from the time of undertaking the practical scheme of building the Camden & Amboy Railroad, that road was constructed, running, and carrying passengers and freight, with entire success, between the cities of New York and Philadelphia. Robert L. Stevens and his brother Edwin, who was the business manager of the enterprise, thus performed in two years a feat which at that time, if you will consider the development of the mechanical arts, the state of the financial transactions of the world, and the unknown elements which entered into the problem, was a greater performance than if any man were now to undertake to build a road from New York to San Francisco in two years. The world never saw a greater triumph than the construction of that road."

From *The Traveller's Guide* for 1833 I extract the following:

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though more costly than Stevens' improved form, even with the addition of the tie plate, it has some advantages. In the "Morton Memorial" volume is a facsimile of the letter and design of rail and fastenings submitted to Mr. Guest of the Dowlain Works, who rolled these first flanged 40-pound rails for Mr. Stevens. The iron was so excellent that "some is still in use on side tracks." Morton Memorial Volume, p. 119.

From Philadelphia to New York

The routes and modes of conveyance being various, we give a sketch of each, that the traveller may make such selection as shall be most agreeable.

Steamboat and Railroad route.

Since the completion of the Camden and Amboy railroad from Bordentown to Amboy, the traveller will find this a very easy, elegant and expeditious route. The distance from Philadelphia to New York is 85 miles, and the intermediate distances as follows:

By steamboat.	MILES	*By railroad.*	MILES
From Philadelphia to Burlington, N. J.	18	Hightstown	14
Bristol, Pa.	1	Amboy	20
Bordentown, N. J	9	*By steamboat.*	
		New York	23

Burlington, the capital of the county of the same name, is twelve miles below Trenton and eighteen above Philadelphia. It is delightfully situated, and contains some handsome public and private houses.

Bristol is one mile farther, on the opposite side of the Delaware, in Bucks county, Pennsylvania. This place contains several fine residences, and is an attractive and interesting country village. Some of its flower gardens, which are unusually elegant, and located on the margin of the river, add much to the beauty of its appearance.

Bordentown, nine miles farther, and six below Trenton, is noted as the late residence of the Count de Survilliers, the ex-king of Spain, whose elegant mansion was within a few years burned by accident, but is now rebuilt with additional embellishment and magnificence. His villa commands a fine view of the river. The soil around it is unproductive; but by the aid of culture and art, his residence now exhibits an appearance of taste and munificence worthy the princely fortune and dignity of its proprietor.

At Bordentown, the Camden and Amboy Railroad is taken, which is finished to South Amboy; from whence a steamboat is again taken, which lands passengers at New York. The charter of this road was granted by the legislature of New Jersey in 1830, and the travel between Bordentown and Amboy commenced in 1832. Camden, the southwestern point at which the road is to terminate, is a small village on the Delaware, opposite Philadelphia, twenty-seven miles below Bordentown, where the river is about one mile in breadth. South Amboy is seated at the head of the Raritan Bay, sixty-one miles and ten chains from Camden, as measured by the course of the railroad; and is about twenty-three miles from the city of New York (by water) making the whole distance from Camden to New York rather less than eighty-five miles.

South Amboy, where the road terminates at the eastern end, is one of the finest harbors in the United States, accessible at all seasons for the largest vessels from the sea and from New York; so that the communication with Philadelphia and foreign countries by this route will be uninterrupted. Possessing, too, great advantages for a port of entry and departure, during the winter months, and having added to it the facilities for transportation of the cargoes of merchant traders by the railroad, it must become an important point for the mercantile operations of Philadelphia, independently of the advantages of its nearer connection with New York.

The tolls and freight for these cargoes must treble the profits now derived from this source and the passage of persons across the state of New Jersey. The sum now received for light freight and the passage of persons, by the present conveyances, is estimated to exceed $500,000. The completion of the whole of this great work has been calculated as not likely to exceed $1,200,000; so that it is probable, when the road gets fully into operation, a very heavy amount will be annually returned to the stockholders.

The company have also been allowed to take the stock authorized to be raised for cutting a canal from the Delaware to the Raritan River, and have purchased out all the turnpike companies from the one to the other, and thus secured to themselves a monopoly of the transit business of every kind, during the continuance of their charter (fifty years).

It is proper, however, to add that the state has reserved 1,000 shares of the stock, amounting to $10,000, and has received from the company a guaranty for the payment of $30,000 annually.

A single track, with occasional turnouts, has thus far only been made; but the workmanship and materials are of the best and most durable kind. Entire iron rails are used, which rest on stone blocks and sleepers. The carriages are elegant, and among the best which have been constructed; and a trip across the road will be ranked among the novelties and pleasures of a northern tour.

Strange to say it was only on October 1st of the same year that the Erie reached Dunkirk, that the Hudson River Railroad was opened for business. Railroads had been developing the country for twenty years, and at that date there were over 14,000 miles in operation, before the city of New York was connected with the capital of the state by a direct line of rails. The necessity was not greatly felt as the Hudson River served both cities. The Harlem Railroad also, though chartered in 1831, was only opened to Chatham in 1852. But when the great Commodore got control of the Hudson River his genius foresaw the necessity of consolidation. He became the parent of the large family of railroad magnates, and his roads constituted the first of the great railroad systems. The New York

Central was created under an Act to authorize the consolidation of certain railroad companies, passed by the legislature April 2, 1853. This act legalized an agreement by which ten lines and their branches which connected Albany with Buffalo sold their franchises and properties to the New York Central Railroad Company. The agreement begins as follows:

> *Agreement* made this seventeenth day of May, in the year one thousand eight hundred and fifty-three, BETWEEN the Albany and Schenectady Railroad Company, The Schenectady and Troy Railroad Company, The Utica and Schenectady Railroad Company, The Mohawk Valley Railroad Company, The Syracuse and Utica Railroad Company, The Syracuse and Utica Direct Railroad Company, The Rochester and Syracuse Railroad Company, The Rochester, Lockport & Niagara Falls Railroad Company, The Buffalo and Lockport Railroad Company, all bodies corporate existing under the laws of the State of New York.

Thus the New York Central & Hudson River Railroad came into existence.

The Traveller's Guide for 1833, from which we have already quoted, gives not only distances on the two early roads, connecting Albany with Saratoga, but details which are not now furnished by railroad guides. A few extracts follow:

> Page 150. *From Albany To Saratoga Springs, By Railroad.*
>
> The distance from Albany to Saratoga Springs is thirty-six and a half miles. The route is by the way of the Mohawk and Hudson and the Saratoga and Schenectady Railroads, the line being continuous to Saratoga Springs, and a passage effected in about three hours. The carriages of the Mohawk and Hudson company start several times a day from the depot on the north side of State Street, a little below the Capital Square in Albany, and the trains on the Saratoga and Schenectady road are made to correspond therewith. By means of these improvements a ride to the Springs, which was formerly tardy, and attended with clouds of dust and much fatigue and lassitude of body, now constitutes one of the greatest sources of novelty and pleasure in a visit to those celebrated fountains of health. Freed from all care or apprehension of danger, the traveller glides through a country diversified with much interesting scenery, encountering in his course, from the rapidity of the motion, a current of air sufficient to render even a summer's sun agreeable, and finds himself at the far-famed Saratoga, ere he is aware that it is possible he can have overcome the distance in so short a space of time.

The Mohawk and Hudson Railroad was commenced in the summer of 1830, and a single track so far completed that passengers were conveyed over twelve and a half miles thereof in one year thereafter. Since then, a second track has been made, and a branch constructed from State Street, in Albany, which unites with the main road, about two and a half miles from the city. The main line commences on the Hudson River, about a mile south of State Street, and crosses South Pearl Street, under a fine stone arch of durable materials and handsome construction; from whence it passes up the hill with an inclination of one foot in eighteen until it reaches the summit, one hundred and eighty-five feet above the Hudson. At this place a building is erected which contains a double stationary engine, estimated at twelve horse power, which is used in hauling freight wagons up the plane.

The road then proceeds northwesterly up to the head of Lydius Street, and passes over two heavy and high embankments, and through two or three deep cuttings near the alms-house.

From the head of Lydius Street, it proceeds in a perfectly straight line (with the exception of a small curve, which, with most people, passes unnoticed) for twelve miles, crossing the heavy embankment called the Buel viaduct, and ascending a plane for about three miles, of one foot in two hundred and twenty-five. Afterwards ascending by two or three other planes of different points, and crossing several waterways upon embankments, it proceeds to the Schenectady summit. The ascent to this summit from the level of the Hudson is three hundred and thirty-five feet. At this point, to which we have in imagination conducted our readers, a beautiful view is obtained of the canal, the Mohawk River, and the city of Schenectady. A double stationary engine is placed here and may thus be described. In the cellar of a house which is built on stone foundations across the road, and on the north side, are placed the boilers. The steam is conducted into two horizontal cylinders firmly secured, seven and a half inches in diameter. The shackle bars are connected with an axle, on the extremity of which is a crown wheel, working in another at right angles, on a shaft placed vertically. This vertical shaft carries at its upper end, which is near the surface of the road and directly in its centre, a large wheel, around the circumference of which the hauling ropes pass, and run on rollers placed at regular distances down the plane. The plane overcomes a height of one hundred and fifteen feet, with an inclination like that near the Hudson, and running down a heavy embankment, strikes the Saratoga and Schenectady Railroad and the Erie canal about a half mile from the principal street in Schenectady; but the track is prolonged upon a level to State Street, opposite Davis' Hotel.

With the exception of the embankments, stone blocks are principally used to support the rails, which are Norway pine, plated with iron. The blocks rest on broken stone well rammed down in trenches; and the entire workmanship of the road, which was under the direction of J. B. Jervis, Esq., as engineer, is probably not surpassed by any construction of the kind in this country or Europe.

Passengers are carried upon this road in coaches, drawn by horses, and by locomotive engines.

A part of the coaches are built like the common post coaches, peculiar to our own country, carrying from nine to twelve passengers; and a part are constructed somewhat similar to those used on the Manchester and Liverpool road, accommodating from eighteen to twenty-four passengers each, divided into apartments of six or eight.

The entire cost of this road has been between eight hundred and nine hundred thousand dollars.

The expansion of the New York Central was inevitable, and therefore, when Chicago became the great distributing emporium of the West, it became almost necessary that the lines connecting that Western center with Buffalo should be brought into harmonious coöperation. And therefore the Lake Shore & Michigan Southern and the Michigan Central, with its Canadian lines, were absorbed, though as independent factors, into the New York Central System; which since then has grown, in order to ensure its share of the freight of the whole Middle West, into a system operating over 13,000 miles of road.

The Pennsylvania Railroad has increased by similar methods of purchase and leasing until it controls over 11,000 miles of road.

Consolidation has recently proceeded at so rapid a rate, and the aggregation of lines of road into groups under single administration has become so general throughout the length and breadth of the Continent, that in this country, of the 230,000 miles of railroad, 165,000 miles, or seventy-one per cent, are comprised in fifteen systems. In Canada the control of the main highways of traffic is proportionately in fewer hands than those of the United States. The Grand Trunk, the Canadian Pacific, and the Canada Northern (known as the Mackenzie-Mann road) include 18,000 miles out of a total of 23,000 miles. Mexico has followed the example of France, Belgium and other Latin countries by refusing to grant perpetual concessions or absolute ownership of its lines to a railroad company. The law reads:

"Art. 27—Concessions for railroad lines shall not be granted for a term exceeding ninety-nine years." The policy of President Diaz' administration was that the Republic control and operate the main lines of railroad transportation. At present, of a total of mileage of 14,982, the Government, though not owning all the securities, dominates 8,138 miles.

The motives which actuated the early railroad companies, whether state owned or private owned, are illustrated by the many differences in gauge originally adopted. Mr. Westinghouse, in his paper on "The Electrification of Railways," says that "in 1878 there were in the United States eleven different gauges in railroad tracks in addition to the standard gauge of four feet eight and one half inches." The battle of the gauges was fought more bitterly in England than in this country, where, except the Erie in this country and the Grand Trunk in Canada, all lines rapidly adopted the standard of four feet eight and one half inches. This distance between tracks was originally forced on the roads because it was the average distance between wagon wheels used on both the highways and the railways when vehicles were drawn by horses. Now that that reason for accepting the arbitrary gauge has long ceased to exist, most railroads I think would prefer that even the six foot gauge of the original Erie road had been retained. Instead of long-articulated engines of the Mallett type we could build bigger locomotives of the standard type, without making them topheavy. The gauge of the Grand Trunk of Canada was five feet six inches, and was said to have been adopted in order to insure Portland being the terminus of Canadian traffic through the Atlantic & St. Lawrence Railroad, and prevent the trade going elsewhere, especially to Boston. (Pennington's "Ways and Other Ways," Page 83.)

This was not an isolated case, for when the early roads were projected, it was seriously considered advisable to differentiate gauges so as to prevent rival roads entering one another's domain and robbing freight which each would more rigorously control if the gauges were different. When the Mexican railroad concessions, to reach the international boundaries, were under consideration by the Mexican commission, the danger of permitting the adoption of the gauge favored by her northern neighbors was so acutely felt, lest it might facilitate invasion and the transportation of war material in case of hostilities, that considerable adverse influence was used against the preference of our own standard. The demands of trade have ultimately overridden most obstructions, though those growing out of international jealousy are the hardest to surmount. As it is, the gauge of all the main lines of the continent are now uniform, excepting a certain number of mountain roads, which, on account of the facility of overcoming sharp curves, have adopted the thirty-six inches gauge. As a result of uniformity of gauge, the cars of any road of the three neighboring countries can travel over the roads of the continent. As soon as a car leaves its own road, the foreign road over which it travels pays the road owning it a per diem charge. Between Mexico and the United States no road of either country crosses the frontier, though the Southern Pacific owns the Arizona & Eastern Lines, which connect at Nogales with the Sonora Railroad, also owned by the Southern Pacific; and at Douglas the Nacozari Railroad, owned by the El Paso & Southwestern, connects with the main line of the United States corporation. There are four other junction points connecting the two countries—Laredo, Eagle Pass, El Paso and Naco.

But the boundary line seems to interpose no barrier between the railroad systems of Canada and those of the United States. Both countries offer every facility for the movement of trains; the transfer of passengers back and forth across the boundary line, and of freight in bond. The Michigan Central leases the Canadian Southern, and the Great Northern has extended its tracks and owns six branches in Canada. Of the Canadian roads the Grand Trunk owns 1,466 miles within the United States, and the Canadian Pacific 3,281 miles.

So intimate are the railroad relations of the two countries that Canada, in constituting its railroad commission, while endowing it with greater powers than those of our Interstate Commerce Commission has adopted as compulsory over the Canadian railroads, the same methods of keeping statistics and accounts imposed on our roads. As there is so much international communication by roads owned by these friendly neighbors, negotiations are on foot to create and define the powers of an international commission.

Among the survivals of the past is the use of private cars on the public railroads, but they are no longer hauled by private motive power. Before the Pullman Company cars were introduced early in the sixties, several roads had their own sleepers, but the convenience of a single company providing accommodations for the railroads of the country has come to be so keenly felt, that even the long Pacific roads, with one exception, pay toll to the Pullman Co., which has generally in service over five thousand hotels, moving on wheels.

Another class of private cars affords the shipping public a similar service to that which the Pullman Company affords to passenger traffic. It is found more practicable that refrigerator cars, constructed for the transportation of meat, butter, fruit and other commodities, which must be maintained at a given temperature, should be operated by independent companies rather than by the separate railroads over which they are hauled. One reason is that the refrigerator cars are moved from section to section of the country, to answer the requirements of the fruit and other harvests, as they mature.

The absorption of the smaller roads into so-called systems under a single management is in conformity with the prevalent industrial tendency, but it may have been stimulated by the provisions of the Sherman Act, which forbids railroads to pool their earnings; combine to distribute freight; to contract alliances with parallel roads, or to make agreements of any kind with one another that can be construed into an attempt to throttle competition, in restraint of trade. It has thus almost driven certain prominent roads into acquiring actual ownership or stock control of connecting roads, especially if they lead to great distributing centers, or ocean terminals. The system policy certainly antedated the Sherman Act, but this measure would seem to have accelerated the actual amalgamation of the railroads. It would appear also to have suggested the creation of large industrial companies by the actual purchase and ownership of works, which had been built up and run as independent enterprises by able and ingenious men, proud of their progeny but tempted to sell them by the exorbitant prices offered.

On the other hand the motives actuating the great financiers and railroad managers and others who have brought about these stupendous consolidations of capital and energy have not been sordid. Personal ambition acts as an irresistible impulse to carry to fruition great schemes. And as the visions of expansion open up before the imagination of the resourceful minds, they cannot help but try to convert the visions into a reality. It is not fair to attribute solely to the greed of wealth the carrying out of many of our great enterprises. The interest and zeal of the game itself is the inducement—winning the game is merely the prize.

This movement toward consolidation is involving a radical change in our industrial life, and of necessity in our code of commercial laws. Moreover, the consolidation of railroad after railroad into huge systems; the absorption of mines and works into monstrous corporations, owning over sixty per cent of the raw material; and the manufacturing equipment of articles on which the national prosperity depends, puzzles the average man, especially if he be discontented. He may be led to argue that if there is advantage in such combinations, and the work can be better done by central boards of financiers, in Wall Street, than by the original miners, mechanics, and metallurgists, who originated the units out of which the consolidation is built, then would it not be better to carry consolidation a little farther and constitute the Government the owner and vest the management in the people's nominees? This would seem to be the logical conclusion, but only if certain very doubtful premises be admitted. If railroads could be run by machinery alone, without managers and without men, Government ownership would be ideal; but the Government will find it still more difficult to find able and honest managers at government salaries than the railroad boards do. As to the men, there will be no difficulty in finding the million and a half to operate the roads, especially if they are allowed to fix their own wages. But when reforms are in the air, the reformer is like the aviator, who, the higher he soars, the more daring he becomes. The task of operating 230,000 miles of road running through regions physically so diverse as ours, will be difficult; but not as difficult as satisfying the demands of the hundred million people, inhabiting these regions, with their varied interests and requirements. Government ownership, however, has not yet become one of the practical problems of legislation. When seriously contemplated it will be found to involve such tremendous difficulties and dangers that, reckless as people are, when suffering under real and imaginary grievances, they will probably decide on some other less heroic remedy before embarking on Government ownership. The alternative will be regulation and control more rigid than now exerted. The railroads, having heretofore been so free from interference, find it difficult to adjust themselves to outside dictation. On the other hand the Government will find it as difficult to decide how far to go and when to desist. There will be much bitter feeling excited, and needless opposition created, unless the Government and the railroads combine to create a code of operating rules and to adjust equitable tariffs. With all their faults the railroad managers and the traffic managers compose a body of very able men who have reached their present positions by reason of ability and long training. The Government representatives, even the members of the Interstate Commerce Commission, have had neither the experience nor the education of the railroad officials in management or rate making, but they can bring to the solution of the problems which present themselves, minds more free from professional prejudices than the trained railroaders, and they can appreciate better than the railroad officials the justice of certain of the complaints which the public make. If, therefore, the training of the expert railroad operating man and the knowledge of the traffic manager were lent to the commissioners, their decisions would probably be more judicial, because formed on more correct evidence, and framed after discussion of technical details, with which the members of the Commission cannot possibly be familiar.

The attitude of the railroads in not embracing Government interference in the person of the Interstate Commerce Commission, with all the ardor of a lover, can hardly be wondered at, for the railroads were so long unembarrassed by any regulations but those they imposed on themselves, that they submit to control less submissively than if they had always been dictated to. Moreover, the older men in the service who have during the past thirty and even forty years, untrammelled, created these great arteries of traffic, through which the industrial life blood of the nation flows, may be forgiven if they resent the indifference with which the public reward their labors and refuses to recognize all it owes to them. Nor have they always been the men who have made fortunes.

The first organized inroad on their independence was after the Patrons of Husbandry and the Granger movements in the sixties and the early seventies. These agitations were followed by the report of the Windom Committee, the Regan Bill and finally the Report of the Cullom Committee, made in 1886. It was this last which led to the creation of the Interstate Commerce Commission in 1887.

The states had granted charters and state boards had regulated interstate rates, but it was not till 1866 that a *Federal law* was enacted that " every railroad company in the United

States whose road is operated by steam, be and hereby is authorized to *carry upon and over its roads*, boats, bridges and ferries, *all passengers, troops, government supplies, mails, freight and property, on their way from one state to another state,* and to receive compensation therefor; *and to connect with roads of other states so as to form continuous lines for the transportation of the same to the places of destination.*" The act of 1866 recognized but did not attempt to regulate interstate commerce.

It required persistent agitation, the accumulation of many facts and much evidence, and the recommendations of the two committees above referred to, extending over twenty years from 1867 to 1887, before the first Federal control became effective. By that time railroad officials had been so long practically free from Government regulation, and had virtually legislated for themselves on all matters of rates as well as management, that abuses had unquestionably crept in. Favoritism to large shippers was looked upon in the light of naming a wholesale rate to them as against a retail rate to the small shipper; passes were given to all patrons on the flimsiest pleas; great inequalities of rates existed, for greater irregularities were justifiable then than now. No doubt certain sections of the community suffered, and, as is always the case, laxity of control generated laxity of precaution and of morals; but nevertheless, in 1887, when the Interstate Commerce Commission came into existence, the railroad mileage of the country had grown to 149,901 miles, the total revenue had reached one billion dollars. Moreover, these railroads had been built by private enterprise and at individual risk, for though Government had assisted by the grants of 117,000,000 acres of land, this was rather a bonus to posterity than a contribution to immediate necessities.

There were then no less than five lines spanning the mountains from the plains to the Pacific, through hundreds of miles of almost uninhabited wastes. Arizona, for instance, with its area of 500 miles by 500, according to the census of 1880 had only

60,000 inhabitants; but was served with 500 miles of railroad. The men, who had taken great risks, came to consider themselves the best judges of what their reward should be, and what therefore the people they benefited owed to them. There was and is of course another side to that question; but when independence has been so long enjoyed, it is liable to be looked upon as a right, and any infringement on it as a grievance. The liberality which has distinguished all the public acts of this country led more or less to the same vicious result. The land laws virtually gave away all the public lands. The mineral land laws disposed of the mineral lands, enormously valuable though they have proved to be, for the petty sum of five dollars per acre, or less than it has probably cost the Government to maintain the administrative expense of selling them. The people, after the elation of the Civil War, generously invited the world to enter and help them to develop their resources, and offered the wealth of the world every inducement to build railroads and other public utilities. Men and money flowed in, and development and exhaustion proceeded perhaps more rapidly than was good for either public morals or public welfare and advantages not contemplated were taken of these generous acts.

A halt should have been called long ago, and our agricultural land laws, our mineral land laws, our coal land and timber land laws amended or adjusted to the altered conditions of the country and of our industrial life and progress; but neither the departments nor Congress have had the courage to face the difficulty. It has been found easier far, and a more congenial task, to punish those who have been tempted to take advantage of the defective laws and the lax regulations than to frame better laws and more consistent regulations which can be obeyed. Be it said, however, in extenuation of the wrongdoing of railroads, that the public was as much to blame as the roads. No rebate, big or little, was given without being asked for; no pass without being solicited; and pooling, if a sin, was the result of the unbridled competition of which the public was guilty, when it encouraged the building of parallel or needless roads. For the people will persist in thinking that two roads instead of one, when one can carry the freight, means half rates, rather than double rates, if both roads are to live.

The Interstate Commerce Act was a measure imperatively needed. The Commissioners are men who have commanded the confidence of the railroads and the public; and their decisions have been generally recognized as just and beneficial. It would be expecting too much to suppose that being men and fallible they have never made mistakes, or to expect that the railroads would always have commended their decisions. But, I think, the majority of railroad managers admit that the railroads have benefited through being compelled to obey legitimate rulings and obliged to refuse favors which otherwise could not be refused. That every one has not got all that every one asked of the Commission is a blessing, for which the public should be thankful. The Act has been amended again and again, and every amendment has been in the direction of increased public control. For instance, the first Act empowered the Commission to adjust unfair rates on the complaint of a supposed victim; the last Act authorizes the Commission to take the initiative and reduce any rate which it thinks excessive. If it were empowered to adjust all inequalities and to raise rates as well as reduce them, more even justice would be done.

The Interstate Commerce Commission has also the power not only to determine how revenue is to be distributed, whether betterments and certain improvements may be paid for out of profits, or whether the cost must be capitalized; but it of necessity prescribes the manner in which the accounts must be kept and the form and frequency of statements. The demands in this respect are becoming very burdensome to the railroads, and the volume of reports must bulk so big that the premises of the Interstate Commerce Commission will have to be annually enlarged. The Commissioners who came from Germany some years ago to report on our railroads were struck by what they considered the unnecessary amount of clerical work in which we indulged. They were amazed at the clerical force employed by the Pennsylvania Railroad. After examining our system and the machinery—mechanical and human—for working out the system, they came to the conclusion that "at all events we can learn from the extent of statistical work in America how it is not to be done." Referring to the volume of writing and the irritating noise of the typewriter, they reflect that "the whole of it means a bulk of writing that cannot be done away with too quickly, according to our view." If they should return they would find that the bulk has nearly been doubled by the order of the Interstate Commerce Commission. Collecting statistics amounts to two and one half per cent of the total cost of operating one thousand miles of railroad with which I am connected. A single statement recently called for has cost $1,509, but that was an exceptional case.

While we, strange to say, though a practical people, have in this respect gone statistical mad, the Interstate Commerce Commission is doing good work in their endeavor to reduce the alarming number of accidents on our railroads. They certainly have been appalling, but unfortunately the efforts of the Commission, directed chiefly to inspecting equipment, have not reduced them, though they have prevented their increase. The following table (p. 441) traces the deaths and accidents to their causes.

It is not the fault of the Interstate Commerce Commission nor of the railroads only that the high ratio of accidents is maintained. The public is to blame.

It is undeniable that the precautions for safety taken elsewhere, when railroads were first built, were not demanded or observed here. The country was thinly settled and gates and gatekeepers at country road crossings were not really necessary. The towns were small and readily agreed to grant the welcome railroad right of way through a public street or to cancel traffic through a street and actually assign it to the railroad.

SUMMARY OF RAILWAY ACCIDENTS—UNITED STATES

Year Ending June 30, 1908

Accidents Resulting from the Movement of Trains, Locomotives, or Cars

	Employes		Passengers		Trespassing		Not Trespassing		Total	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Coupling or uncoupling	222	3,378	....	....	....	....	....	....	222	3,378
Collisions	300	3,488	104	3,857	35	74	16	488	455	7,907
Derailments	254	2,063	39	2,358	64	68	12	386	369	4,875
Parting of trains	11	381	....	44	2	12	1	8	14	445
Locomotives or cars breaking down	22	257	....	7	4	30	....	1	26	295
Falling from trains, locomotives, or cars	496	6,031	57	490	434	648	12	64	999	7,233
Jumping on or off trains, locomotives, or cars	162	5,770	105	1,550	523	1,623	15	110	805	9,053
Struck by trains, locomotives, or cars	1,236	2,120	....	....	....	....	....	....	1,236	2,120
At highway crossings	....	....	5	7	216	323	616	1,432	837	1,762
At stations	....	....	48	82	396	394	68	187	572	663
At other points along the track	....	....	4	29	3,602	1,962	63	156	3,669	2,147
Overhead obstructions	82	978	....	....	....	....	....	....	82	978
Other causes	350	19,461	16	2,655	213	622	46	1,120	625	23,858
	3,135	43,927	378	11,079	5,489	5,756	849	3,952	9,851	64,714

Gates were not even required where cross streets intercepted the tracks. These privileges once granted, whether they constituted perpetual rights in law or not, engendered very bad habits in the railroads, which have been slow to amend their ways in more senses than one. Grade crossings, which may have been innocent when the railroad was built, are now the scenes of slaughter. A railroad right of way should be as sacred as a domicile, and is in other countries carefully guarded. Here the public generally regards it as a highway, and uses it accordingly; and there would be hot indignation if it were prevented from so doing, though more deaths occur by trespassing on tracks than from accidents in the cars. We are a reckless people and enjoy the excitement of taking risks. Children love to just escape being run over, and older people, to save a second, will cross a track before an approaching train. The same adventurous spirit possesses the trainmen; the workers in our metal and coal mines; and is responsible to a great degree for the higher percentage of deaths and accidents in hazardous occupations in this country than abroad. Another cause is the inferior training and skill of our average workmen to that of the same class abroad. This applies not only to our coal miners, but also to the section hands and unorganized labor on our railroads.

Our method of building up a railroad, while it should serve as a training school, probably works out adversely as an educator. Most railroads in the West and Middle West are built to create traffic rather than to carry freight already developed. They are therefore designed and constructed for light instead of heavy loads, with single tracks and short sidings, sharp curves, steep grades, light rails, and absence of stone ballast; and the equipment purchased corresponds in quantity and capacity with the road bed. As business grows, with the growth of the district which the railroad serves, the primitive construction gives place to a road of higher standard and equipment, applicable to more exacting demands; till, eventually, the temporary expedients become permanent high-class structures with economical rolling stock. But during the formative period the organization is not generally perfect, and the discipline is liable to be lax; and, if rules are made, they are not always rigidly enforced. Then, as in every walk of life, so on railroads, obedience not being enforced, rule and regulation is neglected, and the seed is sown of a crop of very bad habits, which account in part for the appalling mortality due to accidents. This does not apply to the railroads alone.

These desultory and discursive remarks have merely touched on only a few of the many-sided topics in which the public at large is interested. On the public depends the fate of the railroads; and the public should be fair and give the railroads and those who built them credit for some virtues, and some public spirit. It is no easy task to run them, as the public will discover if the state ever takes over the ownership, and therefore the management, of the railroads.

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GAYLORD BROS. Inc.
Syracuse, N. Y.
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